Practitioner's Docket No. 56242

CHAPTER II

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED OFFICE (EO/US) (ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/DE00/00643	03 March 2000	05 March 1999
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED

METHOD FOR PICTURE INSERTION
TITLE OF INVENTION

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APPLICANTS

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231
ATTENTION: EO/US

NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

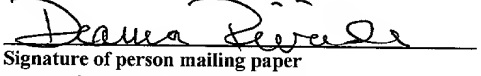
WARNING: *Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. §1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing - See 37 C.F.R. §1.8.*

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 USC 371 otherwise the submission will be considered as being made under 35 USC 111. 37 C.F.R. § 1.494(f).

CERTIFICATION UNDER 37 C.F.R. § 1.10*
*(Express Mail label number is **mandatory.**)*
(Express Mail certification is optional.)

I hereby certify that this paper, along with any document referred to, is being deposited with the United States Postal Service on this date August 31, 2001, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number **EK493798317US**, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Deanna M. Rivernider
(type or print name of person mailing paper)



Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F R § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

WARNING: Each paper or fee filed by "Express Mail" **must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).*
*"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.*

1. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. 371:

   a. [X] This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).

   b. [X] The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2. Fees

CLAIMS FEE [X]*	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	TOTAL CLAIMS	9- 20 =	0	x $ 18.00 =	$0
	INDEPENDENT CLAIMS	1 - 3 =	0	x $ 80.00 =	$0
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + $270.00				$
BASIC FEE**	[ ] U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: [ ] and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(2) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR 1.492(a)(4)) ..... $96.00 [ ] and the above requirements are not met (37 CFR 1.492(a)(1)) ..... $670.00 [X] U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the USPTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: [ ] has been paid (37 CFR 1.492(a)(2)) ..... $760.00 [ ] has not been paid (37 CFR 1.492(a)(3)) ..... $970.00 [X] where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) $860.00				$860.00
				Total of above Calculations	= $860.00
SMALL ENTITY	Reduction by ½ for filing by small entity, if applicable. Affidavit must be filed. (note 37 CFR 1.9, 1.27, 1.28)				- $
				Subtotal	$860.00
				Total National Fee	$860.00
	Fee for recording the enclosed assignment document $40.00 (37 CFR 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				$ 40.00
TOTAL				Total Fees enclosed	$900.00

*See attached Preliminary Amendment Reducing the Number of Claims.

i. [X] A check in the amount of $900.00 to cover the above fees is enclosed.

ii. [ ] Please charge Account No. _____ in the amount of $ _____.
A duplicate copy of this sheet is enclosed.

***WARNING:* *"To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).*

WARNING. *If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.*

3. [X] A copy of the International application as filed (35 U.S.C. 371(c)(2)):

NOTE: *Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.*

a. [ ] is transmitted herewith.
b. [ ] is not required, as the application was filed with the United States Receiving Office.
c. [X] has been transmitted
   i. [X] by the International Bureau.
   Date of mailing of the application (from form PCT/IB/308): _____.
   ii. [ ] by applicant on _____.
   Date

4. [X] A translation of the International application into the English language (35 U.S.C. 371(c)(2)):
a. [X] is transmitted herewith.
b. [ ] is not required as the application was filed in English.
c. [ ] was previously transmitted by applicant on _____.
   Date
d. [ ] will follow.

5. [X] Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. 371(c)(3)):

NOTE: *The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.*

a. [ ] are transmitted herewith.
b. [ ] have been transmitted
   i. [ ] by the International Bureau.

Date of mailing of the amendment (from form PCT/IB/308): _____.

ii. [ ] by applicant on _____.
Date

c. [X] have not been transmitted as

i. [X] applicant chose not to make amendments under PCT Article 19.
Date of mailing of Search Report (from form PCT/ISA/210): **18/08/2000**

ii. [ ] the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. [X] A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. 371(c)(3)):

a. [ ] is transmitted herewith.

b. [ ] is not required as the amendments were made in the English language.

c. [X] has not been transmitted for reasons indicated at point 5(c) above.

7. [X] A copy of the international examination report (PCT/IPEA/409)

[X] is transmitted herewith.

[ ] is not required as the application was filed with the United States Receiving Office.

8. [ ] Annex(es) to the international preliminary examination report

a. [ ] is/are transmitted herewith.

b. [ ] is/are not required as the application was filed with the United States Receiving Office.

9. [ ] A translation of the annexes to the international preliminary examination report

a. [ ] is transmitted herewith.

b. [ ] is not required as the annexes are in the English language.

10. [X] An oath or declaration of the inventor (35 U.S.C. 371(c)(4)) complying with 35 U.S.C. 115

a. [ ] was previously submitted by applicant on _____.
Date

b. [X] is submitted herewith, and such oath or declaration

i. [X] is attached to the application.

ii. [ ] identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. 1.70.

iii. [ ] will follow.

II. Other document(s) or information included:

11. [X] An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):

a. [X] is transmitted herewith.

b. [ ] has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____.

c. [ ] is not required, as the application was searched by the United States International Searching Authority.

d. [ ] will be transmitted promptly upon request.
e. [ ] has been submitted by applicant on _____. Date

12. [X] An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98:
a. [X] is transmitted herewith.
Also transmitted herewith is/are:
[X] Form PTO-1449 (PTO/SB/08A and 08B).
[X] Copies of citations listed.
b. [ ] will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. 371(c).
c. [ ] was previously submitted by applicant on _____. Date

13. [X] An assignment document is transmitted herewith for recording.

A separate [ ] "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or [X] FORM PTO 1595 is also attached.

14. [X] Additional documents:
a. [X] Copy of request (PCT/RO/101)
b. [X] International Publication No. WO 00/54498
i. [X] Specification, claims and drawing
ii. [ ] Front page only
c. [ ] Preliminary amendment (37 C.F.R. § 1.121)
d. [X] Other

Preliminary Amendment, Forms PCT/IB/304, PCT/IB/306, PCT/IB/306, International Preliminary Examination Report

15. [X] The above checked items are being transmitted
a. [X] before 30 months from any claimed priority date.
b. [ ] after 30 months.

16. [ ] Certain requirements under 35 U.S.C. 371 were previously submitted by the applicant on _____, namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges if extra claims are authorized.*

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

[X] The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. **04-1105**.

[X] 37 C.F.R. 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: *Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.*

[X] 37 C.F.R. 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

[X] 37 C.F.R. 1.17 (application processing fees)
[X] 37 C.F.R. 1.17(a)(1)-(5)(extension fees pursuant to § 1.136(a).
[ ] 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

[ ] 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).

SIGNATURE OF PRACTITIONER

Reg. No.: 33,860

Peter F. Corless
(type or print name of practitioner)

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Docket No. 56242

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: M. Brett et al.

EXPRESS MAIL LABEL: EK 49379831US

FILED: HEREWITH

FOR: METHOD FOR SUPERIMPOSING PICTURES

THE HONORABLE COMMISSIONER OF PATENTS AND TRADEMARKS
WASHINGTON, DC 20231

SIR:

PRELIMINARY AMENDMENT

Applicants file herewith the above-identified application. Please amend the application as follows.

IN THE CLAIMS

Please cancel claims 1-9 without prejudice.

Please add the following new claims.

10. A method for inserting an inset picture (EB) into a main picture (HB) constructed from a plurality of lines, which is transmitted with a video signal (HVS) and in the case of which the construction of a new line of the main picture (HB) from pixels is begun when a start pulse (IP) is detected in the video signal (HVS), comprising:

determining the time duration between two start pulses (IP),

after a specific number - dependent on the duration determined and on a desired vertical position (WP) of the inset picture (EB) within the main picture (HB) - of pixels from the beginning of a line of the main picture (HB) that is provided for the insertion, a line of the inset picture (EB) is inserted within this provided line of the main picture (HB).

11. The method of claim 10 wherein the specific number of pixels after which the insertion is effected is described by:

$$b_{actual} = b_{desired} \cdot \frac{T_{actual}}{T_{nom}}$$

where the following holds true:

T_{actual} is the time duration between two successive start pulses,
T_{nom} is the nominal line duration (NZD) of a complete line of the main picture (HB) and
$b_{desired}$ is the number of pixels from the beginning of a line of the main picture (HB) in the case of which the line of the inset picture (EB) would have to be inserted at the desired horizontal position (WP) in event of the time duration between the two start pulses being $T_{actual} = T_{nom}$.

12. The method of claim 10 wherein the nominal line duration (NZD) is selectable.

13. The method of claim 10 wherein the duration between an m-th start pulse and an n-th start pulse is determined and the (n-m)-th part of the duration is used for determining the specific number of pixels (b_{actual}), where the following holds true: $n > m$.

14. The method of claim 10 wherein the specific number of pixels (b_{actual}) is a whole-lined multiple of k pixels.

15. The method of claim 10 wherein the specific number of pixels (b_{actual}) after which each line of the inset picture (EB) is inserted within the respectively provided line of the main picture (HB) is uniform for all lines of the inset picture (EB).

16. The method of claim 10 wherein the specific number of pixels (b_{actual}) after which each line of the inset picture (EB) is inserted within the respectively provided line of the main picture (HB) is uniform for every i-th line of the inset picture (EB).

17. The method of claim 10 wherein the specific number of pixels (b_{actual}) after which a first line of the inset picture (EB) is inserted within the provided line of the main picture (HB) is also used for at least one line following the first line if the deviation of the number of pixels which is calculated for the following line lies below a predetermined threshold.

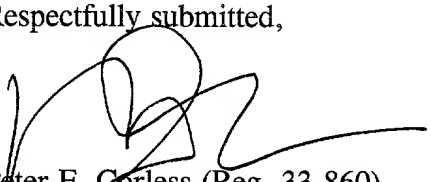
18. The method of claim 17 wherein the predetermined threshold consists of a first threshold value in the case of positive deviations and of a second threshold value, different from the first threshold value, in the case of negative deviations.

REMARKS

To reduce initial filing fees, claims 1-9 have been cancelled without prejudice, and claims 9-18 have been added. No new matter has been added by virtue of the new claims. For instance, support for the new claims appears e.g. in the original claims of the application.

Early consideration and allowance of the application are earnestly solicited.

Respectfully submitted,



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English translation of PCT-application as originally filed

GR 99 P 1358 DE

1/prts

Description

Method for picture insertion

The invention relates to a method for picture insertion into video pictures, as is employed for example with television pictures. In the case of picture-in-picture insertion, a smaller second picture is inset into the usual television picture and can be viewed at the same time as the television picture. Picture insertion also includes the display of subtitles, operating menus and other representations which are generated by a character generator for display in the main picture.

For picture-in-picture insertion in video signal processing apparatuses, in particular television receivers, it is necessary to buffer-store the picture to be inserted in a frame memory in order to delay the picture signal of the picture to be inserted, so that it can be displayed synchronously with the main picture at a predetermined location on a display device, for example a screen. Synchronization with the main picture is effected using vertical and horizontal synchronizing signals in this case. In particular disturbances in the horizontal pulses become apparent in the horizontal picture position by virtue of shaking and displacements.

For synchronization of the insertion channel for the picture to be inserted with the main channel of the main picture, circuit arrangements with phase shifters are suitable, in which an output clock signal coupled to a reference pulse is generated, said signal having a high phase coupling.

In a phase shifter, the clock frequency is fixed. The number of clock cycles between two horizontal

synchronizing signals of the main channel is dependent on the time interval between said signals. Synchronization is produced when the edge of the horizontal signal temporally coincides with the edge of the clock signal for the insertion channel.

A circuit arrangement for generating an output clock signal coupled to a reference pulse is described in DE 195 06 543 C1.

Line deflection in television receivers takes place independently of the picture signals. Therefore, signals of the main channel with a different line duration are always imaged onto the same section of the screen. Since the signals of the insertion channel are coupled to those of the main channel, changes in the line duration lead to position displacements of the inserted picture.

An example will illustrate this. A signal of the main channel with a length of 1 µs is imaged onto 1 cm of the screen. If the line duration changes by 5%, i.e. the signal is now 1.05 µs long, 1 cm can still be seen. However, a signal inserted after 10 µs is inserted after 10 cm, and after 9.5 cm in the case of the changed line duration, because the clock of the phase shifter is independent of the line duration of the main channel.

Since, in the case of a fluctuating line duration, the picture to be inserted changes its position within the main picture a number of times per second, a viewer is given the impression of a jittery picture to be inserted.

It is an object of the present invention to specify a method for insertion of a picture to be inserted, in which the position of the picture to be inserted within the main picture is independent of the line duration of the signal for the main picture.

This object is achieved by means of a method having the features of patent claim 1.

The invention provides for calculation of the position displacements of the inserted picture that are to be expected on account of changes in the line duration of lines of the main picture, and correction of the actual insertion position relative to a position to be chosen in the case of line durations that are always constant.

The invention has the advantage that undesirable position displacements of the inserted picture are avoided. This means that the inserted picture can be displayed in a manner free from jitter.

Furthermore, it is advantageous that the invention can be carried out using a digital circuit arrangement and existing synchronization circuits with phase shifter can be extended in a simple manner for the purpose of carrying out the method.

In order to correct the insertion position of the picture to be inserted, it is suitable to effect adaptation of the number of pixels after which, in each case measured from the beginning of a line of the main picture, a line of the picture to be inserted is inset into the main picture, by a factor. This factor results from the ratio of the line duration - deviating from a nominal line duration - of a line of the main picture and said nominal line duration. The nominal line

duration is the length of a signal with the signal content for a line of the main picture given undisturbed transmission and processing of the signal.

The error in the measurement of the line duration can be reduced if the line duration is averaged over a plurality of lines of the main picture. When determining the line duration for a line, the time between two successive start pulses is measured. In the event of averaging, the time between a first start pulse and, for example, the sixth start pulse following said first start pulse is determined. The averaged line duration is then 1/6 of this time.

In the case of picture insertion, the signal for the main picture is synchronized with that for the picture to be inserted. By counting down clock cycles starting from the occurrence of the start pulse, it is possible to determine where within a line of the main picture the picture to be inserted is to be inset. During a clock cycle, a specific number of pixels are displayed on the screen. Thus, during a plurality of clock cycles, a multiple of the pixels of one clock cycle are displayed.

Jagging of vertical edges of the picture to be inserted can be counteracted by an insertion position that has been determined also being maintained during the subsequent lines of the main picture independently of the actual line duration. By way of example, it may be provided that the insertion position is uniform within a field of the main picture. A newly calculated insertion position is used only for the lines of the subsequent field.

According to a further embodiment of the invention, a present insertion position is departed from only when the difference between the current line duration and the previously calculated line duration exceeds a specific magnitude. In order to avoid jumping back and forth between two insertion positions, said magnitude can be chosen to be different depending on whether the difference has a positive or negative sign.

Further advantageous designs and developments are characterized in subclaims.

The invention is explained in more detail below with reference to the single figure, in which:

Figure 1 shows an illustration for elucidating the insertion position.

Figure 1a diagrammatically illustrates a main picture HB and an inset picture EB which is inserted into the main picture HB. The main picture HB is composed of picture lines, one of which is emphasized as main picture line HBZ in figure 1a. The picture lines of the main picture HB are formed by pixels. The main picture HB is transmitted via a main video signal HVS which also contains control pulses in addition to the actual picture information that is to be represented on a screen. The control pulses serve to ensure that a picture information item transmitted at a specific point in time is displayed at the location intended for it on the screen. The control signals have a horizontal pulse IP. The latter in each case signals the beginning of a new main picture line.

By way of example, if the main picture HB is intended to be represented on a cathode ray tube, then the main video signal HVS must be synchronized with the electron

beam which scans the screen line by line in such a way that when the horizontal pulse IP occurs in the main video signal HVS, the electron beam jumps to the beginning of a new main picture line HBZ.

The time interval between the beginning of a first horizontal pulse and the beginning of a second horizontal pulse directly following the former is designated as the nominal line duration NZD of the main picture line HBZ. In the PAL television standard, the nominal line duration NZD is 64 µs. The nominal line duration is a desired value which is valid under ideal conditions. As a result of interference superposed on the main video signal HVS, or inaccurate detection of the horizontal pulse IP, an actual line duration TZD may be longer or shorter than the nominal line duration NZD. This is the case in particular when the recorded main video signal HVS is reproduced by means of a video recorder.

When the inset picture EB is inserted into the main picture HB, the pixels of the main picture HB which lie in a window defined by the inset picture EB are determined by a video signal assigned to the inset picture EB.

Within the main picture HB, the inset picture EB can adopt various vertical and horizontal positions. The vertical position of the inset picture EB can be described for example by the number of the main picture line in which the first line of the inset picture EB is located. If this is the first main picture line, then the inset picture EB is situated at the top edge of the main picture HB.

The horizontal position HP of the inset picture EB can be described as the number of pixels between the beginning of the main picture line HBZ and a first pixel of a line of the inset picture EB.

The insertion of the inset picture EB must be synchronized with the main picture HB in order that a stationary inset picture can be seen on the screen. The synchronization is achieved using a phase shifter which couples the main video signal HVS to the video signal for the inset picture by their phases.

With regard to a horizontal direction in the main picture HB, the inset picture EB is inserted when a specific number of clock cycles have been counted after the occurrence of the horizontal pulse IP in the main video signal HVS. During each clock cycle, in the main picture line that is currently to be constructed, a constant number of pixels for this line are displayed on the screen. The more clock cycles have elapsed since identification of the horizontal pulse IP, the further the corresponding main picture line is constructed. Within the horizontal direction, the inset picture EB is begun at the location at which the pixels of the main picture HB would be represented at a considered point in time if no insertion were provided. Thus, a desired horizontal position WP is dependent on the specific number of clock cycles which are counted after the horizontal pulse IP.

In the example according to figure 1a, 20 µs have elapsed since the start of the main picture line HBZ, that is to say since the occurrence of the horizontal pulse IP, up to an insertion instant. It is assumed that this corresponds to 300 clock cycles. Within these 300 clock cycles, the pixels of the main picture HB are

displayed on the screen, and afterward, for a number of clock cycles which is dependent on the size of the inset picture EB, the pixels of the inset picture EB are displayed on the screen.

If it is assumed that the actual line duration TZD is equal to the nominal line duration NZD, then, in the example according to figure 1a, the inset picture EB is inserted at a distance of 25 cm from the left-hand edge. The 25 cm correspond to the desired horizontal position WP, which is also the actual horizontal position HP in this case. It shall be assumed here that the length of the main picture line ZBZ = 80 cm.

In figure 1b, the actual line duration TZD = 67 µs deviates from the nominal line duration NZD = 64 µs. The main video signal HVS is still imaged on the 80 cm of the screen. The inset picture EB is once again inserted 20 µs after detection of the horizontal pulse IP. The number of clock cycles between two successive horizontal pulses is larger in the case of a longer line duration than in the case of a shorter line duration. In order to display the inset picture EB on the far right in the main picture HB, a larger number of clock cycles must elapse than in the example according to figure 1a with the nominal line duration NZD. If the inset picture EB is once again inserted 300 clock cycles, which corresponds once again to 20 µs, after the occurrence of the horizontal pulse IP, then it appears on the screen at a shorter distance from the left-hand picture edge of the main picture HB. The actual horizontal position HB no longer corresponds to the desired horizontal position WP. In the example according to figure 1b, it is assumed that the insertion already takes place after 23.9 cm compared with 25 cm in the case of the example according to

figure 1a. The clock of the phase shifter is independent of the line duration of the main picture HB.

The method according to the invention makes use of the fact that the actual horizontal position HP is influenced by the actual line duration TZD.

If the actual line duration TZD is known, then the actual horizontal position HP can be calculated. If the calculated position will deviate from the desired horizontal position WP, a correction is performed.

There is fixed relationship between the number of clock cycles and the number of pixels, since a constant number of pixels is displayed within a clock cycle. To ensure that the inset picture EB appears at the actual horizontal position HP, e.g. 25 cm from the beginning of the main picture line, on the screen, the insertion must be effected depending on the actual line duration TZD after a different number of pixels in the main picture line. In order to achieve the insertion at the desired horizontal position WP, it is necessary, in the case of a line duration exceeding the nominal line duration NZD, for the number of pixels after the horizontal pulse IP until insertion of the inset picture EB to be greater than in the case of the nominal line duration NZD.

The specific number of pixels b_{actual} after which the insertion is effected can be described by:

$$b_{actual} = b_{desired} \cdot \frac{T_{actual}}{T_{nom}}$$

where $b_{desired}$ is the number of pixels counted from the beginning of the main picture line in the case of which

the line of the inset picture EB would have to be inserted at the desired horizontal position WP if the actual line duration TZD were equal to the nominal time duration NZD.

T_{nom} is the magnitude of the nominal line duration NZD and T_{actual} is the actual line duration TZD. It may be expedient to choose T_{nom} such that the value deviates somewhat from the value prescribed by a television standard, in other words T_{nom} is slightly greater or less than a standard value.
It may be advantageous, given different sources for the main video signal HVS, to use different values of T_{nom} as a basis. By way of example, T_{nom} is chosen differently for video recorder operation than in the case of reception of the main video signal HVS via antenna.

$b_{desired}$ results directly from the desired horizontal position WP. In the case of the nominal line duration NZD, the number of clock cycles encompassed by the main picture line HBZ is proportional to the length over which the main picture line HBZ is written on the screen. By way of example, the number of pixels after which insertion is intended to be effected is half the number of pixels of the complete main picture line HBZ if insertion in the middle of the screen is desired.

The value T_{actual} for the actual line duration TZD is the time interval between two successive horizontal pulses. In order to reduce the influence of measurement errors, it is advantageous to measure the actual line duration of a plurality of main picture lines and to divide the duration thus determined by the number of lines used for the measurements, that is to say to perform

averaging of the line durations over a plurality of main picture lines.

The specific number of pixels b_{actual} can be used for each main picture line into which a line of the inset picture EB is intended to be inserted. In order to counteract jagging of vertical edges within the inset picture EB, it is possible, in the case of main pictures composed of fields, to choose b_{actual} uniformly in each case in the field.

If b_{actual} frequently changes its value within the inset picture EB, that may become apparent from shaking of the inset picture EB. Therefore, it may be provided that the calculated value of b_{actual} is used for insertion purposes only when the difference between the previously determined value and b_{actual} exceeds a previously defined threshold.

Patent Claims

1. A method for inserting an inset picture (EB) into a main picture (HB) constructed from a plurality of lines, which is transmitted with a video signal (HVS) and in the case of which the construction of a new line of the main picture (HB) from pixels is begun when a start pulse (IP) is detected in the video signal (HVS), having the following steps:
   - the time duration between two start pulses (IP) is determined,
   - after a specific number - dependent on the duration determined and on a desired vertical position (WP) of the inset picture (EB) within the main picture (HB) - of pixels from the beginning of a line of the main picture (HB) that is provided for the insertion, a line of the inset picture (EB) is inserted within this provided line of the main picture (HB).

2. The method as claimed in claim 1,
characterized
in that the specific number of pixels after which the insertion is effected is described by:

$$b_{actual} = b_{desired} \cdot \frac{T_{actual}}{T_{nom}}$$

where the following holds true:

T_{actual} is the time duration between two successive start pulses,
T_{nom} is the nominal line duration (NZD) of a complete line of the main picture (HB) and
$b_{desired}$ is the number of pixels from the beginning of a line of the main picture (HB) in the case of which the line of the inset picture (EB) would have to be inserted at the desired horizontal

position (WP) in event of the time duration between the two start pulses being $T_{actual} = T_{nom}$.

3. The method as claimed in claim 1 or 2,
characterized
in that the duration between an m-th start pulse and an n-th start pulse is determined and the (n-m)th part of the duration is used for determining the specific number of pixels (b_{actual}), where the following holds true: $n > m$.

4. The method as claimed in one of claims 1 to 3,
characterized
in that the specific number of pixels (b_{actual}) is a whole-lined multiple of k pixels.

5. The method as claimed in one of claims 1 to 4,
characterized
in that the specific number of pixels (b_{actual}) after which each line of the inset picture (EB) is inserted within the respectively provided line of the main picture (HB) is uniform for all lines of the inset picture (EB).

6. The method as claimed in one of claims 1 to 4,
characterized
in that the specific number of pixels (b_{actual}) after which each line of the inset picture (EB) is inserted within the respectively provided line of the main picture (HB) is uniform for every i-th line of the inset picture (EB).

7. The method as claimed in one of claims 1 to 6,
characterized
in that the specific number of pixels (b_{actual}) after which a first line of the inset picture (EB)

is inserted within the provided line of the main picture (HB) is also used for at least one line following the first line if the deviation of the number of pixels which is calculated for the following line lies below a predetermined threshold.

8. The method as claimed in claim 7,
characterized
in that the predetermined threshold consists of a first threshold value in the case positive deviations and of a second threshold value, different from the first threshold value, in the case of negative deviations.

9. The method as claimed in one of claims 2 to 8,
characterized
in that the nominal line duration (NZD) is selectable.

Abstract

Method for picture insertion

In the case of picture insertions, such as picture-in-picture, for example, fluctuations in the line duration are manifested in position displacements relative to the desired position of the inserted pictures.

In order to prevent position displacements in the horizontal direction, it is provided that the insertion position is corrected in a manner dependent on a determined line duration. The method according to the invention is suitable in particular for picture-in-picture insertions in television receivers.

Figure

FIG 1A

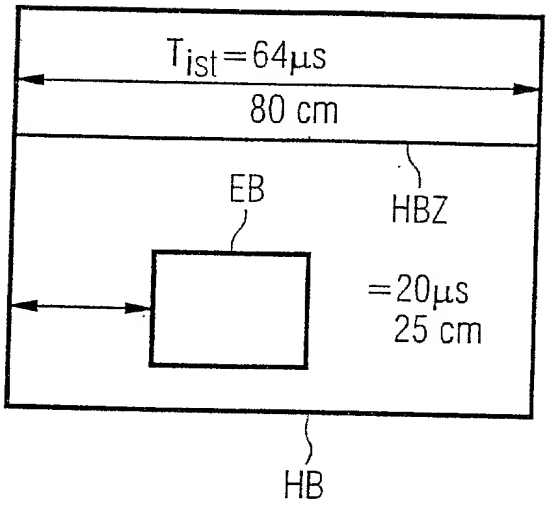
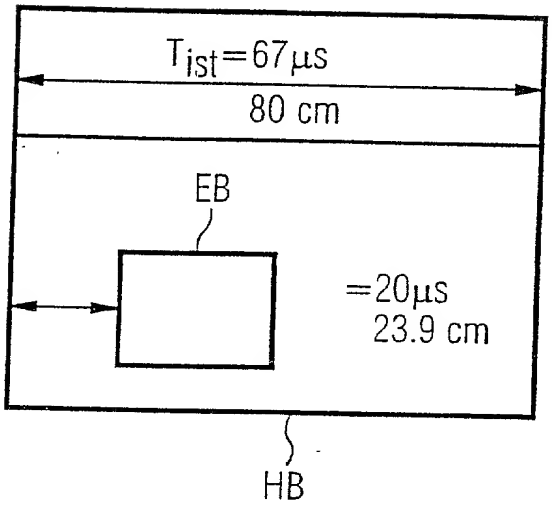

T_{ist}=64µs
80 cm
EB
HBZ
=20µs
25 cm
HB

FIG 1B


T_{ist}=67µs
80 cm
EB
=20µs
23.9 cm
HB

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Docket No. 56242

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that: My residence, post office address and citizenship are as stated below next to my name. I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD FOR PICTURE INSERTION

which is described and claimed in:

☐ the specification attached hereto.

☐ the specification of the same title filed on _____, which claims priority from United States provisional patent application No. _____, filed on _____.

☒ the specification in PCT international application Number, **PCT/DE00/00643** filed on **March 3, 2000**; and was amended on _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign/PCT Applications and Any Priority Claims Under 35 U.S.C. §119:			
Application No.	**Filing Date**	**Country**	**Priority Claimed Under 35 U.S.C. §119?**
DE 199 09 756.9	**March 5, 1999**	**Germany**	☒YES ☐NO
			☐YES ☐NO
			☐YES ☐NO

I hereby claim the benefit under 35 U.S.C. §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose material information as defined in 37 CFR §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Prior U.S. Applications or PCT International Applications Designating the U.S-Benefit Under 35 U.S.C. §120					
U.S. Applications			Status (Check One)		
Application Serial No.	U.S. Filing Date		Patented	Pending	Abandoned
PCT Applications Designating the U.S.					
Application No.	Filing Date	U.S. Serial No. Assigned			
PCT/DE00/00643	March 3, 2000	Not yet assigned		X	

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)
(35 U.S.C. §119(e))

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below:

Applicant	Provisional Application Number	Filing Date

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) with full powers of association, substitution and revocation to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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